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book, and richly illustrated with admirable drawings, without whose assistance a description is not intelligible.

4. From the great rapidity with which, under proper surroundings, the Bacteria and even the fresh-water Desmids grow and multiply, the considerable thickness of strata which the siliceous cells of the latter accumulate in a few years, there is no longer difficulty in the way of understanding the formation of coal beds now, nor the absence of microscopic structure in all true coals, nor their compactness. For pressure alone is amply sufficient to produce this density. Nor is the difference in chemical composition of various coals now so much astonishing, since this will depend on the composition of the predominating protophytes of the stratum. However, these points are not investigated yet, as indeed the whole study has not advanced beyond the establishment of a few fundamental theses. Professor Reinsch does not expect a rapid acceptance of his views, but he desires stimulating capable observers everywhere, to carry the light of science into this dark field of hereditary beliefs.

In conclusion, we would heartily congratulate Prof. Reinsch for this invigorating contribution to geology, in the prosecution of which upon our vast carboniferous areas, botanists and chemical geologists should join hands.—*George A. König.*

GEOLOGICAL NEWS.—Dr. Alpheus Hyatt has published his researches on the forms of *Planorbis* found in the Tertiary beds of Steinheim. The variations are extraordinary, and furnish important evidence for the evolutionist.—Neumayr and Uhlig publish an extensive and well illustrated paper on the Ammonites of the "Hilsbildungen" of North Germany, in the last number of the *Palæontographica*.—Professor H. A. Nicholson, of Edinburgh, publishes a handsomely illustrated volume on the possibly polypoid group of the *Monticuliporidae*.—Mr. S. A. Miller has recently described some additional species of the interesting genus *Myelodactylus* Hall.—Professor Cope has published in the Proceedings of the American Philosophical Society, the cuts illustrating the Permian vertebrata described in his Paleontological Bulletin, No. 32. The genera illustrated are *Eryops*, *Cricotus*, *Empedias* (= *Empedocles* nom. praeocc.) and *Dimetrodon*.

GEOGRAPHY AND TRAVELS.¹

IMPORTANT DISCOVERIES IN SOUTH AMERICA.—In the NATURALIST for April, 1879, mention was made of the departure of Dr. Edwin R. Heath, of Wisconsin, from New York, in November, 1878, for a journey of exploration along the Beni and Madre de Dios rivers, in Brazil. He proposed to continue the work of the late Professor Orton, so sadly interrupted by his death. The *Kansas City Review of Science* for April, contains an interesting account of the success of Dr. Heath's expedition. He has ex-

¹ Edited by ELLIS H. YARNALL, Philadelphia.

plored the Beni and made very valuable additions to our knowledge of this heretofore almost unknown region.

Dr. Heath writes from Reyes, Bolivia, December 20, 1880: "The question of the Beni is solved. The work of Professor Orton is finished. I made the trip from Cabinas (rubber camps on the Madidi) in a canoe with two Indians. I left Cabinas September 27th, and after delays from sickness of my men, at 8 A.M., October 8th, discovered a new river entering from the south, and at mid-day of the 8th, arrived at the junction of the Madre de Dios with the Beni. No other white man has ever seen the mouth of this magnificent river. Crude measurement gave 735 feet for the width of the Beni, and 2350 for that of the Madre de Dios. Took careful observations for latitude and longitude. At 6.50 A. M. of the 9th, I passed the mouth of a river the size of the Yacuma, entering from the north, to which I gave the name Orton. At night we slept on a sand bar joined to a large island. On the 10th we passed this island, and at 8 A. M. another large one, and at 10 A. M. came to a line of rocks obstructing the river and making rapids. One mile further down we came to the main fall, which exhibits a perpendicular descent of the entire river of thirty feet. We occupied the remainder of the 10th in drawing our little craft over the rocks to the water below. With much risk we passed the waves below the falls and camped. On the morning of October 11, we passed some rocks in the river corresponding to the rapids of the Palo Grande of the River Mamoré, but which here offer no serious obstructions to navigation. At 10 A. M., October 11, 1880, we arrived at the mouth of the Beni—that is, at the junction of the Beni and Mamoré Rivers. From thence we ascended the Mamoré, three hundred miles, to Exaltacion and Santa Ana to this place, two hundred miles west over the pampas; brought my boat on an ox cart.

"Here I am safe and sound with a map of three rivers—Beni, Mamoré and Yacuma. From the River Madidi to the mouth of the Beni, there are but four families of Pacavara Indians in the place of 'multitudes of man-eating savages,' as every man, woman and child in Bolivia has believed during many score of years. Rubber gatherers are already taking advantage of my exploration, and have established camps further down the Beni."

On account of superstitious fear of the unexplored portion of the River Beni, the productions of the rubber camps on the River Madidi have ascended the River Beni two hundred miles to Reyes, thence east two hundred miles to River Mamoré, thence three hundred miles north to its union with the Beni—seven hundred miles around, in place of less than three hundred miles direct. The waters of the Beni come down from the gold mines of Bolivia, and through forests of cinchona trees, and those of the Madre de Dios from a much larger area of similar territory of Peru.

"Dr. Heath," writes Professor Parker in the *Kansas City Review*, "alone, unaided, spent two years in patient, determined preparation near the scene of the proposed exploration, and then, in a frail canoe, with only two Indian servants, with certain death before them, as all Bolivia believed, paddled bravely forth to explore a great river and extensive country, where during 350 years, a score of costly expeditions have disastrously failed. It is thought that the governments of Peru and Bolivia will give official recognition of his daring and successful achievement. His work will develop and change the commerce of many hundred miles of mountain and plain. Rubber and bark will now descend the Beni instead of going six or seven hundred miles around."

FRANZ-JOSEF LAND REVISITED. II.—We extract from a paper prepared and read before the Royal Geographical Society, by Mr. C. R. Markham, the following additional information concerning the geology of the land visited by Mr. Leigh Smith.¹

"The lowest rocks belong to the Oxford clay, and are represented, in the collection brought home in the *Eira*, by two belemnites. Above the Oxford clay the rock is of the cretaceous period, to which the fossil coniferous wood belongs, including one very perfect cone. There are also slabs with impressions of plants. Over all there has been an overflow of basalt and lava forming a cap, as on the Island of Disco. The collection of fossils brought home by Captain Markham from Novaya Zemlya, proved the existence of carboniferous rocks there, which dip under the more recent formations of Franz-Josef Land. Exactly the same carboniferous fossils were found by Sir George Nares Expedition at Cape Joseph Henry; and these discoveries point to the probable existence of a carboniferous series of rocks in the unknown region nearer the Pole, on which the cretaceous rocks of Franz-Josef Land are resting. The complete geological examination of the unknown region is one out of many important results to be derived from further Polar discovery."

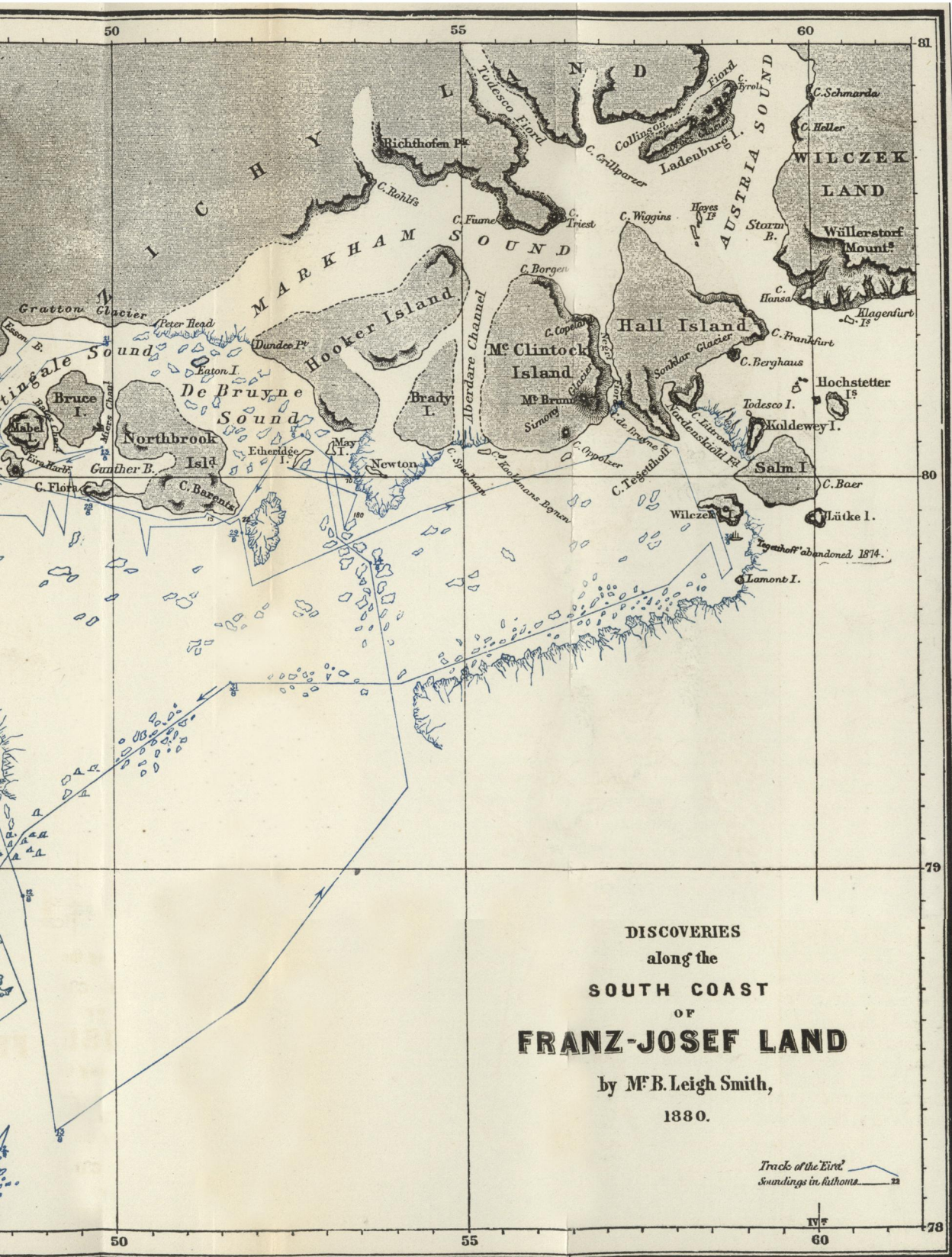
Mr. Markham also speaks of the collection of invertebrate animals found in the sea on the coast of this newly discovered land. Among the Crustacea is "a new genus of Pycnogonida, or sea spiders, a really very interesting form which has never been described before," and which Mr. Miers, writing in the *Annals and Magazine of Natural History*, has named *Anomorphynchus smithii*, after its discoverer. "These sea spiders are found in the British seas of very small size. The large ones have been collected in the Kara Sea; but this new genus is peculiar to the sea of Franz-Josef Land."

In our narrative² of Mr. Smith's voyage, we took from the London *Times* a notice of a "can" being seen on Wilczek Island,

¹ Proceedings of the Royal Geographical Society, March, 1881.

² NATURALIST, March, 1881, p. 254.





but it should have been, it now appears, a *cairn* erected by the Austrian expedition.

In the interesting discussion which followed the reading of this paper, Captain Sir George Nares said, in the course of his remarks: "From Payer's voyage it was learned that the Arctic migratory sea-birds went to Franz-Josef Land earlier than to any known spot. The precise reason for this has not yet been ascertained, but it afforded evidence that the water in the channels that Payer traveled over always thawed earlier in the summer than in other parts of the Arctic seas very much further south. This must be in consequence of some very strong current pouring through the strait represented in the chart, thawing the ice. He could not think that this current flowed from the south; if it did it would carry the ice towards the land, and there could not possibly be such a large quantity of water there. He therefore reasoned that the current came from the north, causing a large body of water close to the land by forcing the ice south; a vessel bound north would meet this ice at a distance from the land, and would have to force her way through it." "Mr. Markham has referred to the heavy icebergs that were born there. What became of them was not known. If his conclusion about the northern current was correct, this, in combination with a movement towards the north-west of a lower stratum of warmer water, would carry them towards Wiche's Land, of which nothing was known. They were not found drifting down past Hope Island and Bear Island in any great quantities, and it was still uncertain where they went."

Mr. Etheridge, F.R.S. (President of the Geological Society) said: "Amongst the few specimens which Mr. Leigh Smith had brought, were two or three of what appeared to be distinctly coniferous wood. To settle the age of that wood was a very important question. Was it Eocene, Cretaceous, Tertiary or any other age? After very careful examination of the cone which had been brought home, Mr. Carruthers had no doubt whatever that it belonged to the true genus *Pinus*. There were but two pines now known in the Siberian area, the *Pinus sembra* and *Pinus pallasiana*. No other fossil plant-remains had been brought from that region, but he had no doubt that it was Upper Cretaceous. That settled the question of the existence of Cretaceous rocks and fossils there. Beneath the Cretaceous zone there was, undoubtedly, Oxford clay, which was one of the most important formations in Great Britain and Russia. Beneath that again were older rocks still. A great deal had been done with regard to the groups of Palæozoic rocks in the northern regions, especially through Sir George Nares and Captain Fielding, who secured a fine collection of fossil Mollusca and corals. Captain Markham's investigation of Novaya Zemlya had proved the existence, in that island, of carboniferous rocks, agreeing closely with

those of the Pennine chain. Probably from Petchora Land to Spitzbergen was once continuous land. Sir Roderick Murchison had proved the existence of carboniferous rocks in Petchora Land and the Ural chain, but until he himself examined the specimens from Novaya Zemlya, they were not known to exist in that island. Since Sir George Nares returned, the complete flora of those parts had been described; but unfortunately nothing had been done on the northern coast of Greenland to the eastward, and an exploration of that district and of Franz-Josef Land would give clearer information as to the geological history of the Polar regions, which he felt certain were largely composed of carboniferous rocks. By placing the several acquisitions together and comparing notes on the Ural chain, Petchora Land, Novaya Zemlya, Franz-Josef Land, and Spitzbergen, a complete history could be obtained of those rocks which stretched away to the north of Asia and America."

"The great bulk of the collection brought home by Sir George Nares was carboniferous, but the coal found was of Miocene age and thirty feet thick. No one could doubt this if he knew the plants contained in the shales, &c." * * * * "In the whole region examined by Sir George Nares, none of the carboniferous corals discovered could have lived in water less than 77° , 78° or 80° of temperature, so that most of the rocks of which the Polar regions were composed must have been formed in tropical seas. It was well known that large Enaliosaurian reptiles (*Ichthyosauri*) had been found in Spitzbergen. There were other things brought back by Mr. Leigh Smith, which he (Mr. Etheridge) could not yet make out, but they appeared to him to be older still. With regard to the great lava flows, they appeared to be nine in succession, most likely occurring about the same time as that of the Giant's Causeway, in Ireland, in the Miocene period, or at about the same age as the thick bed of coal found in Smith Sound. These lava flows are perfectly horizontal for many miles, showing that their condition now was just as formerly."

THE THIRD INTERNATIONAL GEOGRAPHICAL CONGRESS. — We have received the programme of the next meeting of the Congress, to be held at Venice on September 15th of this year, and to continue to the 22d. There are three classes of members: subscribers paying fifteen francs, donors giving not less than forty francs, and honorary members nominated by the committee of arrangements. The sections of the Congress are: i. Mathematical geography, geodesy and topography. ii. Hydrography. iii. Physical, geological, meteorological, botanical and zoological geography. iv. Anthropological, ethnological and philological geography. v. Historical geography. vi. Economical, commercial and statistical geography. vii. The study, teaching and diffusion of geography. viii. Explorations and travels.

Any language can be used by the speakers. Representatives

are invited from all geographical societies. Delegates will represent different departments of the Italian Government, and it is desired that commissioners should be appointed by the Governments of other countries. Geographical societies are invited to send in suggestions of questions to be discussed.

In connection with the Congress there will be held an International Geographical Exhibition to be open during the month of September. It is divided into sections corresponding to those of the Congress as follows:

Class I.—Instruments of practical geometry. Apparatus and instruments of topography, geodesy and astronomy. Telemeters, and instruments for measuring velocity. Tables of projection and calculation. Maps exhibiting the various systems of projections. Sidereal maps; maps of triangulation and hypsometry. Original topographical charts. Publications relating to the measurement of the earth. Photographical apparatus.

Class II.—Instruments, portable and of precision, relating to hydrography. Reflectors. Chronometers, marine and pocket. Logs, leads, dredges; apparatus for deep sea sounding; thermometers for measuring the temperature at different depths; instruments for measuring tides and currents; compasses and other nautical instruments (instruments for reduction, parallel and other rulers, &c.).

Marine charts, general, coasting and special; plans of harbors and anchorages. Views of coasts. Maps of currents, winds and tides. Tables and Ephemerides for the use of astronomers and mariners. Publications relating to hydrography and maritime geography. Guides to navigation; catalogues of lighthouses, beacons, &c. Proposals for a uniform international system of buoys and beacons, and for completing the lighting of the coasts. Laying of submarine lines of telegraph.

Class III.—Instruments for observing meteorological phenomena. Maps, atlases, globes representing facts relating to the dominion of physical geography and meteorology. Magnetical charts (isoclinous, isogonous and isodynamic). Charts of isobars and isotherms, &c. Maps of geological, zoological and botanical geography. Other publications and collections relative to this branch.

Class IV.—Maps and atlases referring to general anthropology, ethnology and comparative philology. Other publications and collections relating to these subjects. Grammars and vocabularies of languages little known; comparative studies.

Class V.—Maps and other publications of historical geography. Ancient and modern works and manuscripts relating to the history of geography. Ancient maps and globes. Instruments used by ancient geographers, astrolabes, &c.

Class VI.—Works, charts and diagrams of statistical, economic and commercial geography (population, agriculture, manufactures, commerce, public works, colonization, &c.). Collections of commercial products and objects made from a geographical point of view.

Class VII.—Treatises and methods for instruction in geography. Outlines and landscapes. Wall maps; models and instruments for instructions in geography. Atlases and geographical dictionaries. Charts and maps of the globe, terrestrial and celestial globes. Copies of topographical charts; maps and plans in relief. Different methods of reproducing maps (photography, heliotype, lithography, zincography, photolithography, chromolithography, &c.). Materials and apparatus specially used in the preparation of maps.

Class VIII.—Instruments for expeditions, astronomical determinations and topographical copies; traveling barometers and thermometers, pedometers, sextants, &c. Portable photographic apparatus, specimens of camera lucida. Route maps; sketch maps. Essays, fac-similes, reproductions and collections of every description which illustrate voyages of discovery, photographic views and drawings of countries little explored. Instructions for geographical expeditions. Instruments and equipment of a traveler; portable arms, utensils, tents and medicines; portable boats; waterproof coverings and clothing; apparatus for giving light on nocturnal marches and encampments. Modes of packing and carrying on voyages of discovery. Narratives and publications of all kinds relating to geographical voyages. Publications and instruments used in Alpine climbing.